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STRUCTURAL CALCULATIONS

(Residential Development)

Dias
Historic House
Lateral Analysis Calculation

Fremont, County of Alameda, CA

Gouvis Job No.: 63268
8/11/2015

Developer:
Robson Homes

Dissakorn Eosakul, Director
S5226   Exp. Date 6/30/2017

REGISTERED PROFESSIONAL ENGINEER
DISSAKORN EOSAKUL
No. S 5226
Exp. 6/30/17
STRUCTURAL
STATE OF CALIFORNIA

July 24th, 2015

Terry Wang

Robson Homes

2185 The Alameda Suite 150

San Jose, CA 95126

Dear Mr. Wang:

Per your request, we have performed a structural analysis for the existing masonry building at site of 42232 Mission Blvd, Fremont CA 94539.

The proposed scope of work is to check if the existing masonry walls still have adequate shear capacity for the lateral force calculated by the current building code after remodeling of the house (Relocate window/ door opening at exterior walls). Please refer to sheet S-1 for opening layout and details. To verify the structure is adequate to resist lateral load, attached calculation is provided for reference.

The lateral analysis is based on 2013 CBC and ASCE 7-10. For masonry building, seismic load will be controlling over wind load. The design spectral response accelerations are obtained from USGS seismic design maps. Design criteria is 20 psf for roof dead load and 78 psf for 8" masonry wall unit weight correspondingly. Equivalent lateral force procedure is used according to ASCE 7-10 Chapter 12.8. The allowable shear stress capacity is calculated based on Section 4.7.1 from "2006 Design of reinforced masonry structures". Considering for construction necessity, 1 ft on each side of every opening is subtracted from segments that can be provided to resist lateral load.

According to calculation, both north and west walls shear capacity is larger than demanding. This reaches the conclusion that with the proposed opening resizing and relocations, the building at subject address is adequate to resist seismic loading.

Please let us know if you have any questions.

DK Eosakul, S.E., LEED   AP BD+C
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GOUVISengineering
consulting group, inc.

SHEET:	I
JOB NO.:	63268
DATE:	8/3/2015
CLIENT:	DIAS HISTORIC HOUSE

TRIBUTARY
AREA = 231 SF.

TRIBUTARY AREA = 1094 SF.

NORTH WALL →

5'-6"   9"   4'-8"   5'-10"   10'-1"   6'-10"

3'-9"

1'-10"

↑
WEST WALL

NORTH WALL: 5.5"+0.75'+4.67'+5.83'+10'+6.83'=33.58'
WEST WALL: 1.83'+3.75'=5.58'
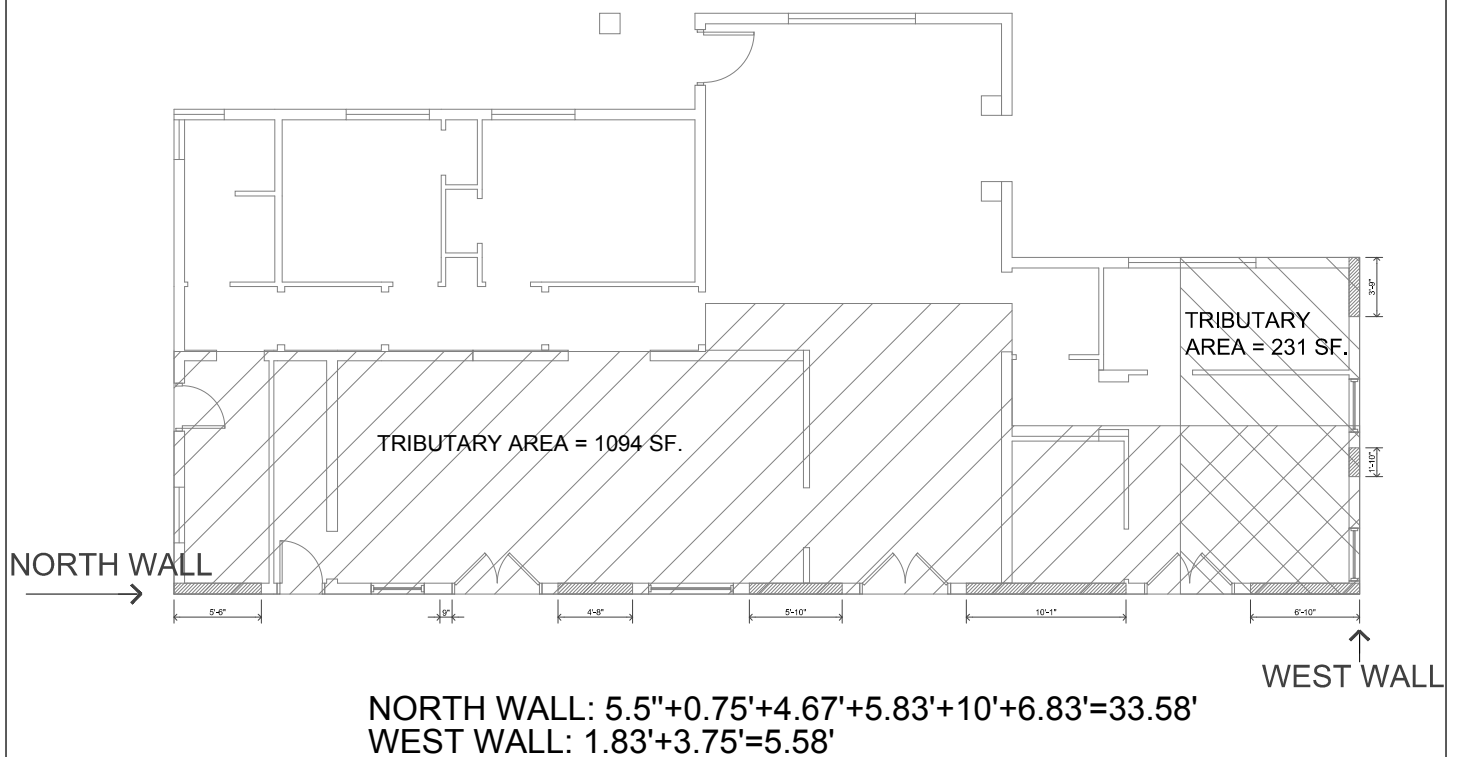
SHEAR WALL LAYOUT

Information:	Project	=	Dias House
	Number	=	63268

Design Loads:	Dead	=	20.00 psf
	Live	=	20.00 psf
8" Masonry Wall wt.		=	78.00 psf

For mansonry building, Seismic load controls.

Seismic Coefficients: From USGS printout

S_s=	2.375	S_1=	0.987
S_{ms}=	2.375	S_{m1}=	1.481
S_{ds} =			1.583
S_{d1} =			0.987

Height =	29.5 ft
C_t=	0.02
T=	0.25 sec
x=	0.75

Design Base Shear

$C_s = S_{ds}/(R/I)$	=	0.79		eq. 12.8-2 ASCE 7-10
$C_s = S_{d1}/(T(R/I))$	=	1.95		eq. 12.8-3 ASCE 7-10 *(MAX.)*
$C_s = 0.01$	=	0.01		eq. 12.8-5 ASCE 7-10 *(MIN.)*
$C_s = 0.5S_1/(R/I)$	=	0.25		eq. 12.8-6 ASCE 7-10 *(MIN.)*
V=CsW	=	0.79 W		eq. 12.8-1 ASCE 7-10 *Seismic Base Shear*

ASCE 7-10 Seismic:

Area	=	2192	sf
Roof Wt.	=	43840	lb
Wall Wt.	=	78	psf
Height	=	9.00	ft
Wall peremeter	=	222	ft
Wall Wt.	=	155844	lb
R	=	2.00	ASCE 7-10 Table 12.2-1
I	=	1.00	(ordinary reinforced
Cs	=	0.79	masonry shear wall)
V	**=**	**123412**	lb

Alloable shear stress on masonry Fv is give by the smallest of following:
(a)	$1.5\sqrt{f'm}=$		58.1 psi
(b)			120 psi
(c)	37 psi + 0.45Nv/An=		41.8 psi (partially-grouted)

Fv	=	41.8	psi=	3946.5 plf

Wall   North

Tributary Area=		1094 sf
Earthquake load=	$\dfrac{V}{Total\ Area} * A$	61594 lb
CMU length=		33.58 ft
v=		1834 plf < 3946.5 plf **O.K**

Wall   West

Tributary Area=		231 sf
Earthquake load=	$\dfrac{V}{Total\ Area} * A$	13006 lb
CMU length=		5.58 ft
v=		2331 plf < 3946.5 plf **O.K**